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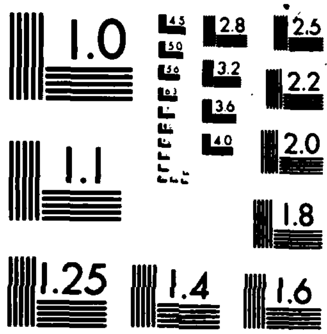

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JTD Info

DOCUMENT NO. 85-0061

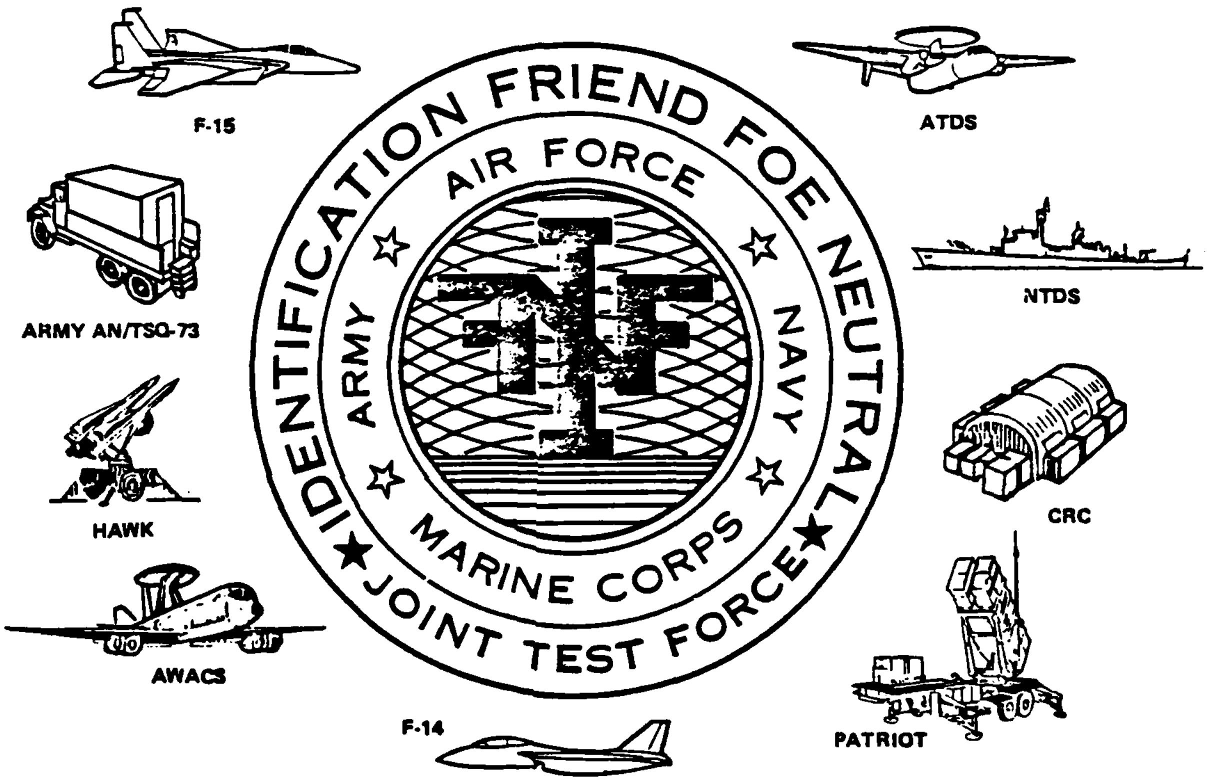
White Paper:

An Overview of How the IFFN Evaluation Testbed System will be Used

Prepared for:

IFFN Joint Test Force
Kirtland AFB, New Mexico 87117

AD-A141 453



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15 NOVEMBER 1983

Identification Friend, Foe, or Neutral

ABSTRACT

This paper describes how the IFFN Evaluation Testbed System (ETS) will be used to investigate aircraft identification problems in combat air defense. The system will fulfill the urgent needs of realism, analysis of air defense reactions, and flexibility. These needs will be met though a large-scale Central Simulation Facility (CSF) and inclusion of both live and simulated participating units such as a PATRIOT Battery. The three major subsystems, all automated to the greatest extent practicable and designed for use by operational personnel are: pretest, which includes test specification, scenario planning, and scenario generation; realtime, which includes initialization, setup, warmup, realtime trial, and end of trial; and posttest, which includes data collection, reduction, and analysis.

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1. INTRODUCTION

The purpose of this paper is to describe how the Identification Friend, Foe, or Neutral (IFFN) Evaluation Testbed System (ETS) will be used to investigate aircraft identification problems in Beyond Visual Range (BVR) air defense during combat.

2. BACKGROUND

It has become increasingly apparent that extensive air combat operations during a non-nuclear conflict, especially in central Europe, will likely take place in a confused and difficult environment. This situation has come about due not only to increased numbers of participants, but also because of recent advances in technologies which affect both aircraft and air defense. These advances have made available greater capabilities while at the same time have increased the complexity of battle management.

The coupling of computers to air defense weapons with BVR capability and long range sensor systems has increased the potential range and lethality of our air defense systems. This increased capability has also increased the potential for error in command decisions. The result is a growing need for accurate and timely information regarding aircraft identification.

Air defense network effectiveness hinges directly on its command, control, communication and intelligence (C^3I) system's ability to quickly collect, process, and evaluate the information required to correctly identify friendly aircraft and direct the engagement of hostile aircraft. Aircraft identification during combat is difficult because of the normal confusion resulting from battle. Performance characteristics of modern tactical aircraft, the advent of low-level penetration techniques, and growing sophistication of electronic countermeasures (ECM) have added to the information processing load of air defense systems. In central Europe, the identification problem assumes larger proportions due to the number of simultaneous operations which must be carried out by the NATO forces, especially in the early time of conflict. Time to correctly identify and successfully engage hostile aircraft is limited.

2.1 TESTBED OVERVIEW

The IFFN ETS consists of a Central Simulation System (CSS) at Kirtland Air Force Base, New Mexico, and a series of Live Participating Units (LPUs) of various types located at their operational or tactical bases within the United States. The LPUs are either actual tactical units or highly realistic tactical unit simulators manned with qualified crews. Each LPU has a Satellite Simulation Unit (SSU) connected to the CSS via high speed communication lines. It is through the SSUs that stimulation and operational data are furnished to the LPUs. High speed, long-distance telecommunication systems allow ETS components to be geographically dispersed. This permits use of the best available representation of the actual systems while minimizing the cost and system availability impact on supporting commands.

The command and control nodes and weapons systems which would interact with the live weapons systems under actual conditions are reproduced via man-in-the-loop computer simulations operating at the CSS. These computer simulations have been developed to reproduce the central European air combat environment within which the air defense systems operate. The environment includes anticipated NATO and Warsaw Pact aircraft as well as the integrated functioning of elements of the NATO air defense command, control, and communications systems.

The ETS is designed for maximum user control and interaction in assessing the actions and reactions of current air defense systems. In addition, it is specifically designed to have sufficient flexibility to accommodate investigation of the contributions of new or improved identification capabilities. Analysis of the data produced from test sessions will provide insight into solutions to the variety of command, control, and communications problems which can be expected to occur in central Europe.

2.2 TESTBED PURPOSE

The primary purpose of ETS is to monitor and evaluate C3I performance of NATO and US air defense weapons systems. It does so by stimulating live participating units with operational environments and simulating additional participating units. The simulations present sensor and communications system air war scenarios which are realistic, dynamic, and interactive with live units on a realtime basis. The three chief characteristics through which ETS achieves its purpose are:

a. Realistic simulation
b. Ability to record and analyze player reactions
c. Flexibility.

2.2.1 Realistic Simulation

Resources, weather, and geography affect the operational environment; therefore, such things as air base location, declared operational capabilities at each base, individual aircraft characteristics and capabilities under differing mission conditions, and terrain features must be a part of the scenario presented to air defense system operators. Representative Air Order of Battle and Radar Order of Battle for both NATO and the Warsaw Pact (WP) forces (or any others) may be incorporated into the scenario. In addition, the various NATO air traffic control devices, such as transit corridors, special corridors and restricted operations zones, may be included in the scenario because they impact identification during air defense operations.

To allow rapid construction of detailed, realistic scenarios, an extensive set of data bases and a flexible, automated scenario planning system are an integral part of the ETS. Each scenario consists of a series of carefully planned and prescripted times, locations, and actions to be performed by simulated aircraft and other elements of the scenario. Detailed, realtime computer simulations of aircraft, sensor systems, communications systems, and various EW/ECM/ESM devices are activated by the scenario and their combined effects presented to the live weapons systems and operators.

LPUs are presented with the conditions they could reasonably expect in time of war. The Live and Simulated Participating Units (LPU, SPU) sensor models, such as radar, account for such variables as terrain masking and electronic interference. Sensor stimulation, based on numbers of tracks and track actions, can be presented in a controlled, realistic manner. Virtually every aspect of the sensor and communications data presented to the live units can be controlled through the scenario. Most live units will use communications available during wartime. The limitations and potential failures of those communications systems are controllable. Higher headquarters and lateral units are represented by Manned Simulated Participating units (MSPUs). Qualified operators respond on communications channels using the standard terminology for those systems. Digital data communications between the live unit and other units are accurately represented in the scenario. All factors affecting identification and engagement decisions are furnished with high accuracy to ensure realism and add credibility to the results.

2.2.2 Record and Analyze Players Reactions

As a test progresses, the stimuli presented to the live units and the resulting actions taken by those units are recorded. This includes all orders and data passed over voice and digital communication links. When the test is concluded, all recorded digital data is reduced and placed into data bases. These contain detailed information regarding observed activities which occurred in a trial, as well as summary information. Thus, the effects of single and multiple factors can be assessed for their impact on air defense effectiveness. Tests can be replayed in part or in their entirety.

2.2.3 Provide Flexibility

The scenario preparation capability has been constructed to allow wide latitude in the generation of the desired air war environments and their accompanying aircraft actions. Realtime modeling of sensor and communication systems yields general purpose, parametrically driven simulations, rather than special purpose, one-of-a-kind ones. The Trial and Analytical data bases, as well as their accompanying data reduction systems, feature a general purpose design. To further expand the usefulness and flexibility of the system, substantial capability has been provided to monitor and control key ETS activities during a trial. This includes interactive control of LPU stimulation. Extensive use of color graphics is made for dynamic monitoring of LPU, SPU, and prescripted scenario activities.

3. ETS COMPONENTS

Functionally the ETS resembles a wheel with the Central Simulation System, (CSS) at the hub. The CSS is connected by spokes of communication lines to the LPUs on the circumference. LPUs will be added sequentially .

3.1 TEST SUPPORT PERSONNEL

Qualified personnel, with various levels of experience in test and tactical operations and trained in ETS functions, execute and evaluate test operations. The required positions/functions are: Test Director (TD), Test Control

Monitor (TCM), Manned Simulated Participating Unit (MSPU) Operator; Satellite Simulation Unit (SSU) Operators, Track Controllers, Scenario Designers, Data Base Administrators, Data Reduction Analyst, Communications Operators, and Computer Operators.

3.2 CENTRAL SIMULATION SYSTEM (CSS)

The CSS contains the entire central simulation system, the support data processing subsystem, and the communications subsystem. The final CSS equipment suite will consist of seven Perkin-Elmer 3250 computers with associated peripheral and display equipment. The CSS is divided into four main parts containing:

a. The testbed command center
b. The interactive emulation area
c. The data processing area
d. Communications area.

Figure 1 depicts the first three of these areas.

3.2.1 Testbed Command Center

This area is the nerve center of the testbed. It contains a large screen display and work stations for the Test Director (TD) and Test Control Monitors (TCMs). Gallery seats are provided for test observers. From this area, the TD and the TCMs monitor and control test operations. They have the capability to modify trial events as well as monitor and control the scenario. The TD and TCMs can also monitor and control SPU actions and prescripted simulated aircraft. TD and TCM workstations each have both a color graphic and an alpha-numeric terminal. Hardcopy of screen displays can be requested at any time.

3.2.2 Interactive Emulation Area

This area contains 18 work stations for MSPU operators and track controllers. During a test session, these work stations simulate the various weapons systems and command and control nodes which interact with live units (e.g., PATRIOT fire units, AN/TSQ-73 Missile Minders, and Control and Reporting Centers).

3.2.3 Data Processing Area

This portion of the CSS is a large equipment room for data processing and associated peripheral equipment. In addition, there are stations for the data processing operators. It is here the pretest and posttest graphics are processed at special control stations. Disk and tape storage are provided for processed data.

3.2.4 Communications Area

The communications area is located in the basement of the CSS. It includes communications consoles, equipment, patch panels, and power supplies.

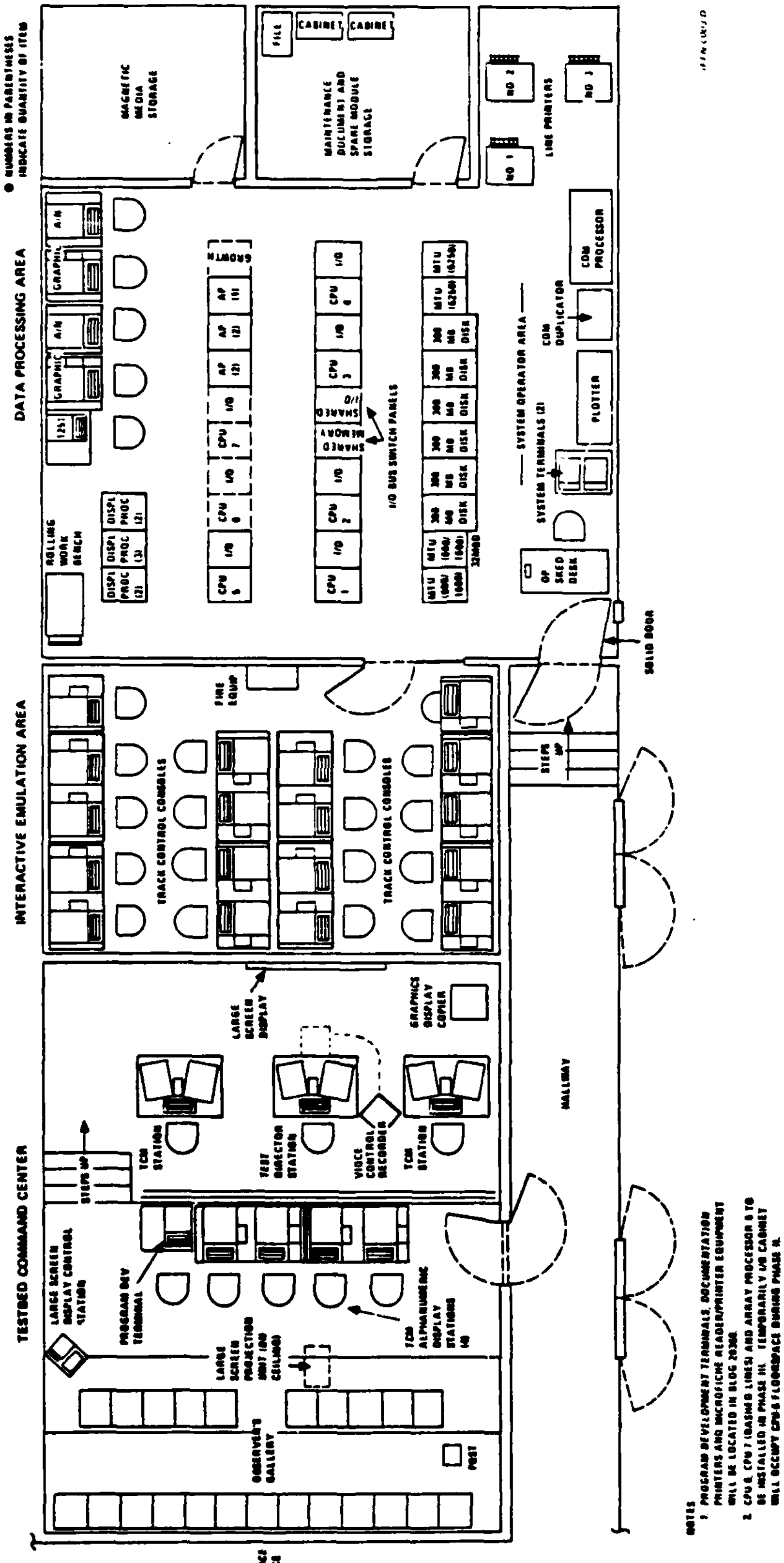

Figure 1. Physical Layout of the Central Simulation Facility

3.3 LIVE PARTICIPATING UNITS (LPUs)

The first LPU is the Army PATRIOT Battery. A PATRIOT tactical operations simulator (P-TOS) which incorporates the PATRIOT command and control interfaces as well as the equipment and simulated computational and missile firing features, will portray the PATRIOT in the ETS. The P-TOS is located at Fort Bliss, Texas.

An IFFN Satellite Simulation Unit (SSU) located at Ft Bliss will interface the PATRIOT with the ETS. To P-TOS operators, sensors, and communications systems, the PATRIOT LPU is located at a specified site in Europe with tactically valid communications. The sensor and communications system inputs to the simulator are controlled by the scenario executing in the CSS at Kirtland.

In the same manner, the other live participants will be integrated into the IFFN ETS. The control/firing elements of PATRIOT and IHAWK and their higher headquarters will be interfaced with the CSS as live players. In addition, other air defense systems such as the NATO Airborne Early Warning System, the German Air Defense Ground Environment System, and simulations of the F-15 and F-16 fighters will be incorporated. The ETS is designed to incorporate air defense elements of the U.S. Navy and Marines including the F-14, the E2-C, and other Naval ship and shore based air defense command and control elements. Eventually, the ETS will interface all of the major systems which would take part in the identification process of a European air war.

4. SEQUENCE OF MAJOR EVENTS

A typical IFFN ETS trial consists of three subsystems: Pretest, Realtime test, and Posttest. Each of these is comprised of the following major activities.

4.1 PRETEST PHASE

The Pretest subsystem has three sequential components: scenario specification, scenario planning, and scenario generation. These are performed by the Scenario Design Team. The scenario specification defines the experiment to be conducted. Scenario planning defines, in detail, the testbed configuration, the air war environment, and preplanned activities which will be used to stimulate the LPUs. It also includes the initial processing required to prepare the scenario for presentation to the live units and allows offline review of the scenario activities. Scenario generation completes the processing of the scenario and allows dynamic review of the exercise.

4.1.1 Test Specification

The complexity of performing statistically valid testing of the identification process dictates that extensive planning be undertaken prior to actual test conduct. In addition, since multiple trials are required to accomplish a single test and since each trial requires considerable resources, careful planning is required to make efficient use of the ETS.

For each scheduled test, a test specification must be prepared which clearly specifies:

a. What is to be tested
b. Conditions under which testing is to occur
c. ETS resources required and specification for ETS configuration
d. Objectives and goals to be met by the test
e. Schedule of trials which will make up the test
f. Conditions of the scenario to be used in the test
g. The methodologies to be used for analysis
h. Required testbed preparation activities which must be completed.

Another critical element of the test specification is the description of the analytical methodology to be used in the evaluation of the test results. This description specifies the analytical tools to be used, the reports to be prepared, the data to be extracted and processed, and all other asp s of the data analysis problem. In particular, the criteria must be spec .ed for use in assessing the final test results as well as the quick look anal s. The criteria against which the test results will be compared should be spe ..ed in detail.

4.1.2 Scenario Planning and Generation

The scenario planning and generation processes translate the specification into a computer readable format which can be used for testing. The scenario will contain the preplanned aircraft and other activities as well as data from the data bases to be used in stimulating and simulating the activities of the various participating units. In addition, the scenario contains the data required to configure, initialize, and operate the testbed itself.

Each scenario is constructed in two parts, the scenario environment and the aircraft missions. The environment establishes the air war resource characteristics and constraints as well as the testbed configuration and requirements. The aircraft missions describe the aircraft operational activities which will take place when the scenario is executed.

4.1.2.1 Scenario Environment Preparation. The environment for a test is termed the Scenario Environment Design (SED). The SED is constructed for a particular scenario. It contains the tactical situation data, including the Air Order of Battle, Radar Order of Battle, airspace control configuration, and LPU/MSPU configurations. The SED also contains technical data describing models for systems such as radars, chaff, weapons, aircraft performance, weather, and communications links. Most of the technical data is automatically included as soon as the aircraft, radar sites, and weapon complements are selected. Two sections of the data base can be used in this phase: previously prepared SEDs and the Quasi-Static Data Base. They serve as the initial departure point for environment construction. Developing a SED can proceed in one of several ways, ranging from modifying an existing SED (the most likely way) to starting from scratch. Interactive menus are used for this purpose. For example, if an airbase has been previously defined for another scenario, the designer can simply copy the old airbase definition into the new SED and add of modify the new aircraft types.

Figure 2 depicts the data bases used in environment construction.

4.1.2.2 Aircraft Mission Preparation. Each aircraft mission is a statement of the required operational activity of a single formation of one or more flights of aircraft committed to perform a defined objective or mission.

Mission objectives are achieved within the confines of the environment. In addition, the environment strongly influences the selection and allocation of resources to the mission objectives. As an example, the scenario designer preparing Warsaw Pact aircraft missions must design the missions to accommodate the locations of the batteries which make up the missile "belt" as outlined in the SED.

Aircraft mission preparation uses a Scenario Planning Language (SPL). Missions are generated as required by the objectives detailed in the test specification. SPL is an English-like language used to preplan the dynamic aircraft activity of the scenario. The SPL allows the operator to use aircraft operational language to describe the wide variety of aircraft missions necessary to meet test specifications. Each mission description can be used to specify the detailed activities of multiple aircraft since missions may be comprised of multiple flights of multiple aircraft.

4.1.2.3 Combine Missions and Environment. Using both the SED and the SPL, complete flight plans for all individual preplanned tracks, including timing, routes, and flight sizes are generated automatically. Selection of the aircraft resources for the mission is based on both aircraft basing and capabilities, along with the airbase mission priorities. The resulting flight plans meet the various environmental airspace restrictions such as LLTR and altitude requirements. No weaponeering is performed and there is no attempt to optimize resource assignments and flight plans as would be done in live planning. The generated aircraft flight plans conform to the proper aircraft performance and mission specifications including weapon delivery and ECM actions. User specifications of experimental conditions, such as aircraft arrival rates in user specified volumes, are incorporated. A complete and detailed set of flight plan reports as well as graphics displays may be produced for review by the scenario designers.

The graphics displays allow the operator to select mission flight plans for graphic review based on time, location, mission type, aircraft type, target, and side. The operator can also request color hardcopy plots of selected flight plans. A series of computer programs further transforms the flight plans and the SED data into the format required to actually execute a trial.

Prior to the completion of the scenario, aircraft flight plans are transformed into an editable form with the Scenario Generation Language (SGL). This English-like language is not as operationally oriented as SPL. Where control over specific track activities is required, SGL can be used to generate precise actions.

Once the SGL has been processed and files required for the trial prepared, a dynamic graphics review can be performed. Trial activities can be dynamically monitored during the processing of the SGL.

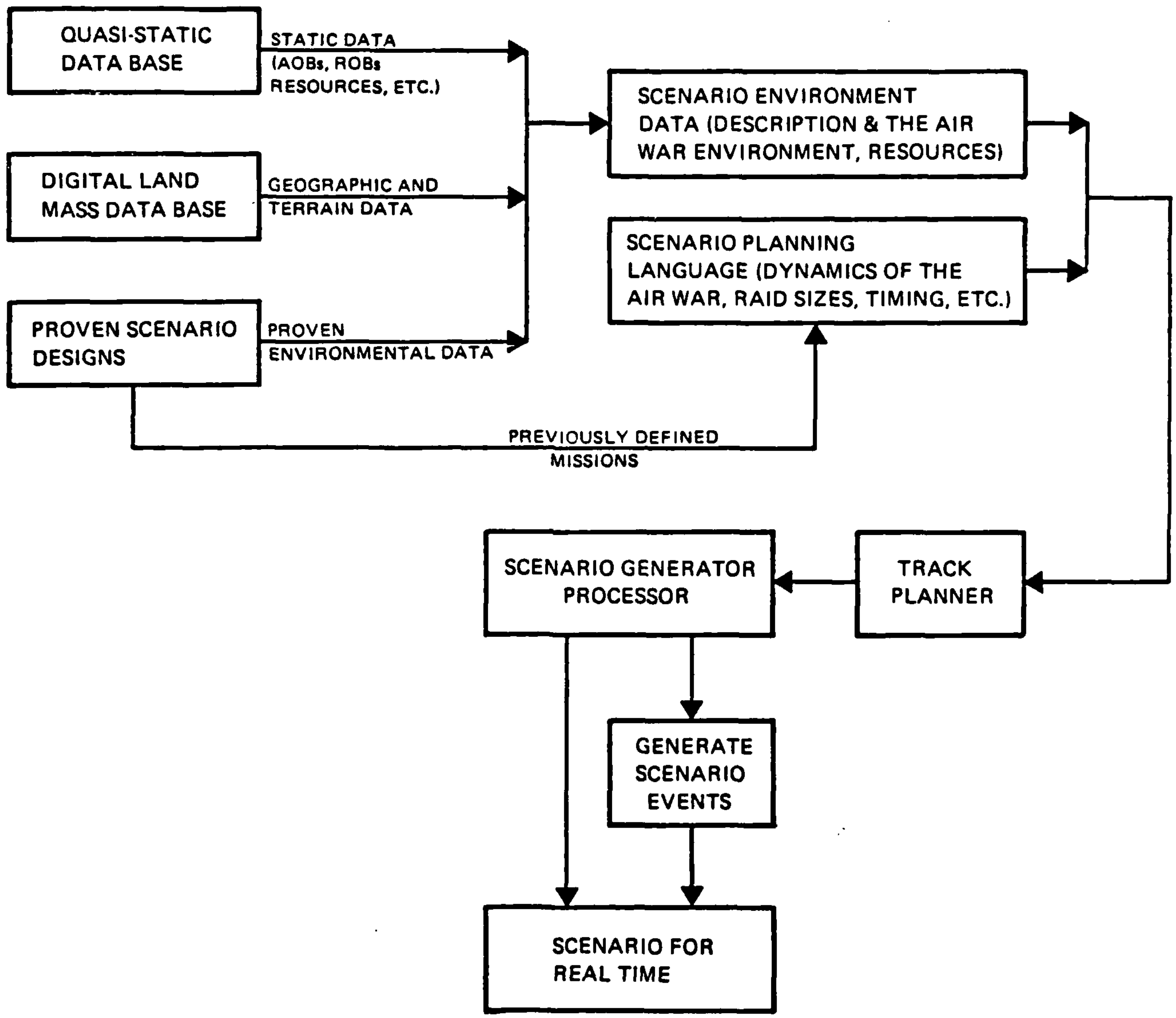

Figure 2. Scenario Development

4.1.2.4 Rehearse and Test Scenario. The final step is a rehearsal run of the exercise. A full exercise checkout en-ures that it will run as required by the test specification. The exercise can be executed for review purposes at a speed in excess of the realtime rate. Scenario designers can monitor track movement and actions.

4.2 REALTIME PHASE

This phase encompasses the actual conduct of the test session on the ETS. It consists of initialization, setup, warmup, trial conduct, and shutdown.

4.2.1 Initialization

Initialization is the powerup sequence of the testbed hardware and initial program loading of the software. The computer operator performs ETS initialization at the direction of the TD.

4.2.2 Setup

Setup of the testbed is directed by the TD or TCM. Selection of the exercise to be executed is made, the testbed configuration data is loaded into the system and the recording function is initialized. Communications linkages with the SSUs are configured, and the initial communications for the trial are confirmed. Determination of which participating units defined in the SED will be SPUs and which will be LPUs is made. The initialization data for LPU processing is transmitted to the SSUs. The SSUs are initialized and the digital data link communications established. The TD/TCM console graphic map displays are processed and made available for use. In order to avoid problems inherent in performing an exercise repeatedly, the TD selects from a set of possible alternate aircraft profiles which changes the tactical data presented to the LPUs without changing the exercise conditions or validity.

4.2.3 Warmup

Warmup involves establishing the initial tactical situation to the LPU and the simulated participating units and verifying their readiness for the start of the trial. The geographic dispersion of the ETS, the degree of human interaction inherent in the operation of the LPUs, and the use of live weapons systems operators require a careful check of the testbed and LPU status prior to starting the trial. Communication systems are verified as being fully operational. Actions necessary to orient the system and verify system integrity are completed in this segment of system preparation.

The exercise is executed to the point at which data collection is to begin ("time zero") and the system is then placed in a "freeze" condition. Execution of the exercise includes the processing of aircraft track movement events and functioning of the simulated sensor systems. The system "track truth" is built up within the system as the track events are processed. During the execution of the exercise prior to time zero, the various testbed functions such as the manned SPUs and data recording are tested and their status reported to the TD/TCM. The data link reporting mechanisms are exercised and results recorded. Once the test director is satisfied that all elements of the testbed are ready, the freeze may be released and the test session initiated.

4.2.4 Realtime Trial

When the exercise is executed, preplanned events are retrieved from storage and processed at appropriate times. The preplanned aircraft track events are processed and the effects of these events are reflected in the changing status of each track. As the aircraft status changes (status includes location, ordnance delivery, reaction, and illumination by a radar), the sensor simulations of the various test subjects react to the tracks. As the sensor simulations react, the weapons system decision making logic at each of the SPUs and the LPUs is stimulated to perform its functions. To the LPU hardware, software, and operators, there is no discernible difference between the simulated sensor data and real sensor data. The LPU operators make decisions and take actions based on the information provided by the weapons system. All elements of the identification process are realistically and accurately represented to the LPU operators.

4.2.4.1 Trial Management Capabilities. Through the realtime system, the TD and TCMs can preplan track activity, LPU and SPU communications, the overall simulated air war, and the testbed operational status.
During the exercise, details are projected on a large color screen display for the TD, staff, and interested observers. The screen may display a background map detailing the terrain of central Europe and the exercise location of the various LPUs and SPUs. Such things as the active LLTRs, transit corridors, airbase locations, cities, and air defense zones can also be displayed. The actions of the aircraft can be overlaid on this map. This same display is also available on the individual TD and TCM consoles.

Other TD/TCM display capabilities include:

a. Selected measures (e.g., number of tracks in an LPU surveillance)
b. Text of selected events/data link messages
c. Tracks/Track status
d. Range rings/Jam strobes/Corridors
e. Multiple link/mode data messages
f. Major testbed elements status
g. Hardcopy selections.

These and other capabilities give the TD and TCMs control of testbed functions and scenario activities during the trial. This includes controlling the rate at which the exercise runs; modifying the fuel load of a track and IFF response probability; generates new tracks from scratch; degrading communications systems; halting/restarting exercise execution and data recording; preventing execution of scenario events; and, recording observations as part of the trial record.

4.2.4.2 MSPU and Track Controller Operations. Manned SPUs provide the LPUs with thee realistic interactions which they would normally have with other tactical units. The track controllers control special purpose "white player" aircraft which interact with participating units.

The manned SPUs can be used to represent various types of C^2 and weapon system nodes. Each SPU is a general purpose console which the TD/TCM can reconfigure

to provide the operational capabilities of the LPUs and other SPUs. This reconfiguration permits console to represent individual weapons system sensor capabilities and vulnerabilities, data link capabilities, threat evaluation and weapons assignment capabilities, and weapons system control capabilities. Track controllers have available a display of track truth for the multiple aircraft which can be simultaneously under their control. Aircraft track control capabilities available to both SPUs and track controllers include the capability to control IFF modes and codes, sensor emissions, target designation, jammer control, heading, altitude, and speed. Track controllers have additional capabilities to accommodate their differing roles to include a multiple aircraft control capability. Track controllers can "take over" a prescripted track or any track created by the TD or TCM.

4.2.5 End of The Trial

An exercise can be ended either by predetermined action of the scenario designer or online action of the TD. The TD can inhibit the scripted end of trial if desired. At trial completion, an orderly shutdown of the testbed functions occurs. Data recorded at the SSUs is transmitted to the central facility for recording. A "quick look" report allows the TD to make a preliminary determination as to the validity of the trial.

4.3 POSTTEST PHASE

Posttest phase activity are data collection, data reduction, and data analysis. Data collection and reduction is largely an automatic activity. It prepares trial data for analysis. The analytical activity is performed by the IFFN staff using ETS tools. Among the more significant of these is the capability to completely replay the recorded trial data for dynamic observation on the various ETS display devices. In addition, data retrieval and manipulation capabilities are provided to facilitiate trial results evaluation.

4.3.1 Data Collection and Reduction

Two sources of input into the data collection and reduction system are data recorded during the test session and certain exercise documentation data not processed during the realtime phase. Data recorded during the trial includes data link messages transmitted between the SPUs and LPUs, preplanned and dynamically generated events, observation logs entered by the TD or TCM, observations logged by SSU operators, and control messages sent between the SSU and the central facility. The exercise documentation data includes data that is not required to be executed during the trial, but is required to ensure that all the analytical data requirements are met. This includes radar siting data, variable conditions settings, and aircraft initialization data.

During processing, a tape copy of the original recorded data is generated for archival purposes along with various statistical reports. Two data bases are generated: The Trial Data Base and the Analytical Data Base. The Trial Data Base contains a complete time ordered record of events and entity interactions with their relative locations taking place during a test session. It also includes the recorded data link messages, aircraft track positions

as a function of time, documentation of the scenario design, TD/TCM operator observation logs, and the computed measures of effectiveness (MOE) for the test session. The MOEs serve as standard devices for objectively and quantitatively characterizing the trial's outcome.

The Analytical Data Base contains the MOEs, the scenario, and the experimental conditions under which they were gathered from all trials performed on the ETS. The Analytical Data Base serves as the primary data source for comparing the relative effectiveness of identification enhancements across multiple trials and tests.

Figure 3 shows the various categories of information included in the two posttest data bases.

4.3.2 Data Analysis

The posttest data analysis tools include the data base management system report writer, the data link message review software, and a graphic display system for review of aircraft track/SPU/LPU interactions. The latter includes the capability for graphic display or hardcopy plots. It also includes a statistical analysis package which provides a capability to develop special purpose analysis programs, and playback capability.

The report writer software retrieves and reviews data from both data bases. It extracts specific data for dissemination to other agencies. It allows analysts to retrieve and combine data to gain insights which might not be apparent from standard reports, and extracts data for submission to the statistical analysis package. The statistical analysis package, using an English-like language, contains programs for examining the data for significant trends.

During the data reduction process, data link messages are correlated with the track truth which stimulated them. The exercise identifier and track truth position are stored with each message in the data base. The analyst may select messages for display on the basis of such categories as link type, message type, time of message, tracks referenced by the message (either exercise identifier, link identifier, or a combination), and message source/destination. The analyst may review the messages from multiple data links simultaneously and request hardcopy printouts.

In addition, analysts can review events graphically. This static display capability depicts tracks in a track truth versus data link reported role. Color hardcopy plots of the track paths and the events which occurred along them can be generated. Analysts can graphically review the interactions which occurred between various simulated aircraft and the air defense systems. The full set of background maps with their overlays of airspace control areas, cities, boundaries, unit and airbase locations, can be shown and plotted on the graphics terminals.

Through the incorporation of live players and the high fidelity, realistic simulations available, ETS operations can produce quantifications of many aspects of identification problems of the air war in central Europe.

TRIAL DATA BASE CONTENTS	
Trial Description	Warsaw Pact Airspace Control Data
Scenario Configuration Data	Warsaw Pact Air Defense Data
Participating Unit Configuration Data	Target Data
Alter Profile Data	Control Point Data
Experimental Conditions	Orbit Data
Communications Configuration	Model Data
Data Link Reference and Special Points	Macro Data
Weather Data	Reaction Macro Probability Data
Preplanned Track Controller Aircraft Data	Initialization Logs
NATO Airspace Control Data	Unit Tables
IFF Procedure Data	Platform Data
Map Data	Operator Logs
NATO Airbase Data	Data Link Time History
NATO Air Defense Data	Track Initialization Data
Data Link Message Catalog Data	Track Position History
NATO Radio Navigation Aids Data	Measures of Effectiveness
	Trial Event History

ANALYTICAL DATA BASE CONTENTS

FOR EACH TRIAL:

- Trial Documentation
- Scenario Abstract
- Experimental Conditions
- LPU Data
  - LPU Configuration
  - Measures of Effectiveness

Figure 3. Contents of Posttest Data Bases

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